

Date of Obs. 1885.		Magnitude of Nova when compared With <i>Polaris.</i>	With $\mu$ Androm.	With $\nu$ Androm.	With R. 204	Adopted Mean Mag. of Nova.
Sept. 7 (a)	—	8.16	8.34	—	—	8.25
9 (b)	8.44	8.51	8.50	—	—	8.48
11 (c)	9.19	9.20	—	9.19	9.19	9.19
13	—	9.08	—	9.01	9.05	9.05
18 (d)	—	9.44	—	9.23	9.34	9.34
21 (e)	9.89	9.92	—	9.70	9.84	9.84
21	10.07	10.09	—	9.96	10.03	10.03
24 (f)	9.63	9.77	—	9.57	9.66	9.66
25 (g)	9.81	9.95	—	9.80	9.85	9.85
26	9.66	9.68	—	9.80	9.71	9.71
30	9.65	9.72	—	9.71	9.69	9.69
Oct. 1 (h)	9.64	9.71	—	9.79	9.71	9.71
3	9.94	9.76	—	9.93	9.88	9.88
5	10.02	10.02	—	9.90	9.98	9.98
7	10.06	10.16	—	9.97	10.05	10.05
12	9.60	9.93	—	9.89	9.81	9.81
16 (i)	9.97	9.89	—	10.02	9.96	9.96

*Notes.*

- (a), (h) Partially fine night; sky hazy.  
 (b) Drifting cloud. Definition not good. (c) Definition bad.  
 (d) Sky very hazy; drifting fog and cloud.  
 (e) Sky variable and foggy. Observation unsatisfactory.  
 (f), (g) Moon nearly full; definition bad. (i) Sky foggy.

Oxford University Observatory:  
1885, November 12.

*Observations of the Spectrum of the New Star in the Great Nebula in Andromeda, made at the Royal Observatory, Greenwich.*  
By E. W. Maunder.

The spectrum of this object was observed with one or other of the spectroscopes of the Royal Observatory on the evenings of September 4, 11, 15, and 30. On the first occasion, when the half-prism spectroscope was used, both in the direct position, and reversed in order to give greater purity, the star gave a perfectly continuous spectrum, in which no lines either bright or dark could be detected. The red, orange, and violet were very faint or altogether wanting, the spectrum being traceable from about D to F, but being scarcely discernible beyond those limits. The spectrum of the star resembled that of the nebula precisely, except of course that it was brighter, and, probably in

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consequence of this greater brightness, was traceable a little farther in both directions.

On the evening of September 11 the single-prism spectroscope was employed, and the lower dispersion of this instrument proved more suitable for the examination of so difficult an object. The spectrum of the star was now traced from about  $\lambda 6600$  to  $\lambda 4300$ ; it was very faint in the red and orange, and began to brighten at a definite point, either D or close to it. Then followed a space relatively very bright, the centre of which was not far from E, but the brightest part of which was further towards the red, at a point for which two readings were obtained, viz.  $\lambda 5457$  and  $\lambda 5508$ , mean  $\lambda 5482$ , and where at times the brightening appeared so definite as to suggest the presence of a bright line. The same general region was also much the brightest in the region of the nebula. The spectrum of the star declined rapidly in brightness beyond F; practically, it might be considered as confined between the two lines, D and F, the outer portions of the spectrum were so much fainter than the central district. From time to time bright lines were suspected in this district, the brightest being the line already mentioned, a second being measured as at  $\lambda 5327$ . The region of the b lines was specially examined, and also the neighbourhoods of both D and F, but no bright lines were seen in either locality.

The spectrum of the star was examined with a small prism held behind the eye-piece, on September 15, and the presence of the two bright lines was again suspected. And again on September 30 they were more satisfactorily observed, although the star had then lost much of its brightness, and its spectrum was but little brighter than that of the nucleus of the nebula. A third line was also suspected about as far beyond the magnesium line  $\lambda 5527$  towards the red, as the brightest of the three bright lines, viz. that at  $\lambda 5482$ , was towards the blue. This would give its position as  $\lambda 5575$ . It could not be decided whether the lines were brighter than on September 11. They were recognised more easily than on that occasion, but, on the one hand, it was now known where they should be looked for, and on the other, the instrument now employed (the half-prism spectroscope in the reversed position) was the same as that used on September 4, when no trace of a bright line could be perceived. It was believed that the brightest line, that of  $\lambda 5482$ , could be traced over or near the nucleus of the nebula, but with so feeble a spectrum it was most difficult to make perfectly sure. The slit also was narrow, and it was found most difficult to keep either star or nebula upon it, their spectra being so faint that they were continually being lost.

On September 11 the spectra of two neighbouring stars were examined with a view to ascertaining whether the faintness of the extreme portions of the spectra of the star and nebula was due to either the spectroscope, the observer's eye, or the general feebleness of the light to be examined, or indicated a real deficiency in

the objects themselves of those kinds of light. The following rough settings were obtained for the limits of visibility of the spectra of two neighbouring stars, the new star and the nebula. The stars examined were Arg. Zone  $+38^{\circ}$ , Nos. 90 and 88.

Object.	Mag.	Limit towards the Red.			Limit towards the Violet.		
		Reading.	Wave length r. tenth metres.	Reading.	Wave length r. tenth metres.		
Arg. Z. $+38^{\circ}$ No. 90	5.5	5.0	7380	85.0	3948		
Arg. Z. $+38^{\circ}$ No. 88	8.0	10.0	6808	76.0	4095		
Nova	...	8.3	12.0	6615	64.0	4319	
Nebula	...	—	17.0	6196	62.0	4363	

It will be understood that the positions obtained are but very rough, as there was no definite point to be measured in any case; the micrometer, indeed, was only read to the nearest whole revolution.

The spectrum of the *Nova* was traceable a little further in both directions than that of the nebula. Towards the violet this seemed entirely due to its greater brightness, but towards the red the difference was greater than could fairly be explained upon this ground. The spectrum of the *Nova* seemed slightly brighter than that of No. 88 in the central district from D to F, but was decidedly feebler in the red and violet regions. The *Nova* was estimated as being three-tenths of a magnitude fainter than No. 88.

The colour of the star appeared to be about that of the D lines, and so far as could be judged it did not vary in tint from night to night, although it grew steadily less intense. On September 30, the last night of observation, a slight orange flush was still distinguished.

Its magnitude was roughly estimated as follows:—September 4, 8.0; September 11, 8.3; September 18, 9.2; September 21, 9.6; September 30, much fainter, and not greatly brighter than D'Arrest's star near it, or the nucleus of the nebula. The *Nova* was examined on two nights, September 18 and 21, to see if any disc could be detected. Both nights were foggy, and the nebula was all but extinguished. On September 21, whilst M. 31 was all but invisible, M. 32 was easily seen. The latter was therefore decidedly the brighter of the two. The *Nova* was perfectly sharply defined and free from fuzziness on both occasions. On September 18, with power 220, "the faintest suspicion of a larger disc than a star should show," was recorded. On September 21 "it bore every power up to and including one of 500, quite as well as the neighbouring stars. It was distinctly and sharply stellar in appearance, nor could anything be detected which could reasonably be termed a disc."

The observations were all made with the South-East Equatorial of 12.8 inches aperture and 17 feet 10 inches focal length.

*Royal Observatory, Greenwich:*  
1885, November 12.